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**To:** Biedrzycki, Paul[PBIEDR@milwaukee.gov]  
**From:** Deltoral, Miguel  
**Sent:** Wed 1/13/2016 12:14:18 PM  
**Subject:** Re: Question re: lead filtration devices for public

Hi Paul,

The short answer on whether you can expect to see elevated lead following full replacement is 'yes' if best management practices (BMPs) are not developed and put in place and 'not likely' if BMPs are developed and implemented except in cases where homes go unoccupied for significant periods of time.

Based on data we have from Madison and other elsewhere, we have certainly seen elevated lead levels for a period of time following full lead line replacement, but ultimately the lead went down to very low levels permanently. I suspect this happened because at the time we did not know what we know now about the magnitude of the release of the high-lead scale and sediment into the home plumbing following disturbances and consequently there were no BMPs in place to deal with clearing that out of the home plumbing. Since BMPs had not been developed, enough of the high-lead particulate likely remained in the home plumbing, released sporadically over time, until it was all gone. If BMPs had been developed and followed, including a thorough home flushing following full replacement of the lead line and periodic aerator cleanings, I believe this would have significantly reduced the likelihood of elevated lead at the tap following full replacement of the lead lines.

Regarding the provision of water filters to residents following full lead service line replacement, my recommendation would be to actually figure out whether the filters are necessary following full lead service line replacement by implementing BMPs for clearing the scale and sediment in conjunction with periodic aerator cleanings on a limited number of homes that have what we believe would be the worst-case premise plumbing scenario (galvanized iron pipe). There is a caveat below on homes that have or had lead service lines that go unoccupied for extended periods of time.

Some additional factors to consider.

The largest lead releases into the drinking water in terms of lead mass and lead

concentration have been from physical disturbances of the lead service line or the non-lead service lead downstream of the lead portion of the service line. The scale and sediment contains 60 to 90+ percent lead and consequently these releases can pose an immediate and acute risk to public health if the water is ingested. Release of high levels of lead can occur from physical disturbances regardless of the effectiveness of corrosion control treatment. I think it would be prudent to develop educational material and BMPs (e.g., utility and resident notification) for all entities whose work may cause physical disturbances to the service lines (e.g., gas, light, cable, construction, plumbing industries).

Non-lead pipe that has been downstream of lead pipe accumulates lead in the pipe scale. This would include the lead and non-lead portions of service lines and interior (premise) plumbing. We have insufficient data on the different pipe materials to provide more specific information regarding the relative risks posed by downstream pipe based on the material (i.e., galvanized iron, copper, plastic) but we hope to collect data on that this year. We strongly suspect that galvanized iron pipe would pose the highest risk because these pipes tend to corrode internally more than copper and obviously plastic pipe, so there are more places in the pipe that the scale and sediment can get trapped. Another issue with galvanized pipe is that if the pipe is significantly corroded (i.e., inner diameter is significantly reduced) the flow rate may not be sufficient to be able to clear all of the scale and sediment from inside the pipe. Aerators should definitely be removed for the flushing to allow maximum flow and turbulence when clearing the scale and sediment.

The stagnation of water can cause the scales in lead pipes or non-lead pipes downstream of lead pipes (including premise plumbing) to deteriorate and subsequently release into the drinking water following re-occupancy. Consequently, homes with lead service lines and homes that had lead service lines that go unoccupied for an extended period of time likely pose a greater risk to the incoming residents. At a minimum, I think we need to start thinking about some type of educational material for realtors, developers, etc. We hope to gather information this year on whether it may be possible to mitigate the risk to incoming residents by periodic and regular flushing of the lines before occupancy.

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**From:** Biedrzycki, Paul <PBIEDR@milwaukee.gov>  
**Sent:** Tuesday, January 12, 2016 02:39 PM  
**To:** Deltoral, Miguel  
**Subject:** Question re: lead filtration devices for public

Hi Miguel -

Thanks for your continued participation in our conversations around lead service line replacement. What are your thoughts re: providing water filtration devices to properties in which FULL lead line replacement occurs?

Can we expect to legitimately see elevated lead levels as a result due to internal plumbing components or captured scale in internal plumbing components?

Thanks.

Paul b.

Sent from my iPad

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